

REMARKS

Claims 1 and 3 have been amended. Thus, claims 1-9 are pending in the present application. Support for the amendment to claim 1 may be found in the specification at page 9, paragraph [0020] and page 17, paragraph [0031]. Thus, no new matter has been added. Reconsideration and withdrawal of the present rejections in view of the amendments and comments presented herein are respectfully requested.

Rejection under 35 U.S.C. § 112, second paragraph

Claim 3 was rejected under 35 U.S.C. § 112, second paragraph as being indefinite based on recitation of “..0 to 20 mol% of the constituent unit (a3)” in line 4, which the Examiner alleged to lack antecedent basis. Claim 3 as amended depends from claim 2 which recites a constituent unit (a3) represented by general formula (III), thus providing proper antecedent basis for recitation of “..0 to 20 mol% of the constituent unit (a3).” Thus, reconsideration and withdrawal of the rejection under 35 U.S.C. § 112, second paragraph are respectfully requested.

Rejection under 35 U.S.C. § 102(b)/§103(a)

Claims 1-9 were rejected under 35 U.S.C. § 102(b) as being anticipated by, or in the alternative, under 35 U.S.C. §103(a), as obvious over Gronbeck et al. (US 2003/0099899). However, Gronbeck neither teaches nor suggests the specific combinations of the component (B) and the component (C) as recited in amended claim 1. Thus, the claims cannot be anticipated or rendered obvious by this reference.

In addition, as described below, the unexpected results obtained when the silsesquioxane resin comprising both the recited constituent unit (a1) and the recited constituent unit (a2) could not have been predicted based on this reference.

As described in the present specification at page 5, paragraph [0005], “conventional negative resists had problems that the unexposed area is inferior in alkali solubility and the exposed area is inferior in alkali insolubility so that it is insufficient in dissolution contrast, and that swelling occurs during the development of the resist pattern and thickness loss of the resist pattern occurs. Therefore, the negative resist was not suited for fine processing.”

The present invention solves the problems described above, and provides a negative resist composition which, unexpectedly, can form a fine resist pattern having a high aspect ratio without causing loss of thickness.

Claim 1 as amended recites a negative resist composition comprising an acid generator component (B) and a crosslinking agent component (C) being selected from a combination of an onium salt containing a fluorinated alkylsulfonic acid ion as an anion (B) and a glycoluril-based or melamine-based crosslinking agent (C), a combination of an oxime sulfonate-based acid generator (B) and an ethyleneurea-based crosslinking agent (C), or a combination of a mixture of an oxime sulfonate-based acid generator and a diazomethane-based acid generator (B) and an ethyleneurea-based crosslinking agent (C). The present specification describes that when these features are employed, a fine pattern can be formed without causing loss of thickness of a resist pattern (see page 17, lines 19-20 of the specification).

Gronbeck has no teaching or suggestion of the significant difference between a silsesquioxane resin comprising both the constituent unit (a1) and the constituent unit (a2) and a silsesquioxane resin comprising only the constituent unit (a1), in terms of suppressing occurrence of thickness loss and enabling formation of a fine resist pattern. Thus, the results obtained using the present invention are unexpectedly superior to those obtained using the Gronbeck teaching.

The presently pending claims also recite a silsesquioxane resin (A) comprising 50 to 95 mol% of a constituent unit (a1) represented by general formula (I) and 5 to 40 mol% of a constituent unit (a2) represented by general formula (II). This feature provides additional unexpected results that further evidence the nonobviousness of the claims. In this regard, the Examiner's attention is drawn to Example 3 and Comparative Example 1 of the present specification. In Example 3, a silsesquioxane resin comprising both the constituent unit (a1) and the constituent unit (a2) (i.e., a silsesquioxane resin satisfying feature (1) above was used, and in Comparative Example 1, a silsesquioxane resin comprising only the constituent unit (a1) (i.e., a silsesquioxane resin which does not satisfy feature (1)) was used (present specification at pages 51-52, Table 1). As a result, in Example 3, a fine resist pattern, particularly a fine isolated line pattern, was formed without loss of thickness (present specification page 50, lines 2-4 and page 53, Table 2). In contrast, in Comparative Example 1, the thickness loss was too large, and as a result, a desired pattern could not be formed (see present specification at page 54, Table 3). Thus, Example 3 and Comparative Example 1 clearly demonstrate the significant difference

between a silsesquioxane resin comprising both the constituent unit (a1) and the constituent unit (a2), and a silsesquioxane resin comprising only the constituent unit (a1), in terms of suppressing occurrence of thickness loss and enabling formation of a fine resist pattern.

The foregoing results are completely unexpected, and could not have been predicted in light of the cited reference. These unexpected results would rebut any case of *prima facie* obviousness if one were present, and strongly support the nonobviousness of the presently claimed invention.

In view of the amendments and comments presented above, Applicants respectfully request reconsideration and withdrawal of the rejection under 35 U.S.C. § 102(b)/ 35 U.S.C. § 103(a)

CONCLUSION

Applicants submit that all claims are in condition for allowance. However, should there be any questions concerning this application, the Examiner is respectfully invited to contact the undersigned at the telephone number appearing below.

Respectfully submitted,

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